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Patent

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Patent Application of:		
	Gregory. G. Davis	
Serial No.:	09/698,536	Art Unit: 2687
Filed:	10/27/2000	
		Examiner: Marcos L. Torres
For:	Dual Mode Uplink/Downlink Location Measurement and Multi-Protocol Location Measurement	

Commissioner of
Patents and Trademarks
P.O. Box 1450
Alexandria, VA 22313

APPEAL BRIEF
IN SUPPORT OF APPELLANT'S APPEAL
TO THE BOARD OF PATENT APPEALS AND INTERFERENCES

Sir:

Applicant (hereafter "Appellant") hereby submits this Brief in triplicate in support of its appeal from a final decision by the Examiner, mailed January 27, 2005 in the above-captioned case. Appellant respectfully requests consideration of this appeal by the Board of Patent Appeals and Interferences for allowance of the above-captioned patent application.

An oral hearing is not desired.

07/06/2005 TBESHAH1 00000014 09698536
01 FC:1402 500.00 OP
07/06/2005 TBESHAH1 00000014 09698536
02 FC:1251 120.00 OP

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I. REAL PARTY IN INTEREST

The invention is assigned to Intel Corporation of 2200 Mission College Boulevard, Santa Clara, California 95052-8119.

II. RELATED APPEALS AND INTERFERENCES

To the best of Appellant's knowledge, there are no appeals or interferences related to the present appeal that will directly affect, be directly affected by, or have a bearing on the Board's decision.

III. STATUS OF THE CLAIMS

Claims 18-45 are currently pending in the above-referenced application. No claims have been allowed. Claims 18-45 were rejected in the Final Office Action mailed January 27, 2005, and are the subject of this appeal.

Claims 18-45 stand rejected under 35 U.S.C. § 103.

IV. STATUS OF AMENDMENTS

In response to the Final Office Action mailed on January 27, 2005, rejecting all pending claims, Appellant timely filed a Notice of Appeal on April 27, 2005.

A copy of all claims on appeal is attached hereto as Appendix A.

V. SUMMARY OF THE INVENTION

Recently (circa 1999), the FCC mandate the introduction of location services that can accurately locate wireless subscribers on all wireless networks. Two previously proposed approaches for implementing such location services are the "uplink" approach and the "downlink" approach.. *See Background of the Invention, page 2, lines 16-20.*

One advantage of downlink location systems over uplink systems is that extra downlink handsets can be added onto a communication network without adding extra capacity to the network. Another advantage of downlink systems is that the required LMU density is lower for downlink systems, because downlink LMUs are only needed to synchronize the frames between the BTSs, and not to make TOA measurements of signals arriving from multiple handsets. But in order to implement downlink location services, TOA measurements must be made in the handset. Unfortunately, most handsets already released in the field (hereinafter "legacy "handsets") cannot implement the TOA measurements required for downlink location estimation. As a result, these legacy handsets cannot be located by a downlink system. This inability to locate the vast majority of existing handsets is a major shortcoming of downlink systems. *See Background of the Invention, page 3, lines 13-28.*

Certain aspects of the present invention relate to combining uplink and downlink technologies into a single location system, to obtain the benefits offered by both of these technology and to eliminate many of their individual shortcomings. Other aspects of the present invention relate to combining location services for different communication protocols into a single system. . *See Summary of the Invention, page 5, lines 2-8.*

In the first group of claims, Claim 18 which may be read on Figures 3 and 4B may be used as an example. It recites:

measuring times of arrival of an uplink signal from a first mobile device *30* at each of at least three measurement units *35, 36, 37*;

computing a location of the first mobile device based on the measured times of arrival of the uplink signal;

measuring at the at least three measurement units *35, 36, 37* times of arrival of downlink signals from each of at least three base stations *31, 32, 33*;

receiving time of arrival measurements of the downlink signals from a second mobile device; and

computing a location of the second mobile device based on the measured times of arrival of the downlink signals and the received time of arrival measurements from the second mobile device. *The uplink and downlink location approaches are described with respect to Figure 3 at page 8, line 26 to page 10, line2 and Figure 4B shows the combined uplink/downlink hardware.*

Claims 31 describes the invention from a different perspective. According to Claim 31, the invention includes:

an uplink processor to implement an uplink location algorithm; *39A as described at 3 at page 8, line 26 to page 10, line.*

a downlink processor to implement a downlink location algorithm; *39B as described at 3 at page 8, line 26 to page 10, line.*

at least three base stations *31, 32, 33*, located at known locations, to communicate with the mobile device *30*; and

at least three measurement units *35, 36, 37*, having an uplink mode and a downlink mode,

wherein, in the uplink mode, each of the measurement units determines a time of arrival of an uplink signal that originated from the mobile device and reports the determined time of arrival to the uplink processor, and the uplink processor determines the location of the mobile device using the uplink location algorithm based on the times of arrival reported to the uplink processor by the measurement units, and

wherein, in the downlink mode, the mobile device determines times of arrival of downlink signals arriving from each of the at least three base stations and reports the determined times of arrival to the downlink processor, the measurement units collectively determine a time of arrival of downlink signals that originated from each of the at least three base stations and report the determined times of arrival to the downlink processor, and the downlink processor determines the location of the mobile device using the downlink location algorithm based on the times of arrival reported to the downlink processor by the mobile device and by the measurement units.

VI. ISSUES PRESENTED

Whether the pending claims are rendered obvious by references that fail to suggest the claimed combination in a single unit.

VII. GROUPING OF CLAIMS

For the purposes of this appeal, claims 18-30 stand or fall together and claims 31-45 stand or fall together.

VIII. ARGUMENT

A. REJECTION OF CLAIMS 18-20, AND 24 UNDER 35 USC §103 IS IMPROPER BECAUSE THE REFERNCES FAIL TO SUGGEST UPLINK LOCATION AND DOWNLINK LOCATION USING THE SAME THREE MEASUREMENT UNITS

The Examiner has rejected Claims 18-20, and 24 under 35 U.S.C. §103 (a) as being unpatentable over Lundqvist, Publication No. WO 99/049691 A2, ("Lundqvist") in view of the admitted prior art. Claim 18 recites uplink location and downlink location using the same three measurement units. The Examiner suggests that it would be obvious to perform both uplink location from Lundqvist and downlink location from Figure 2 of the specification, however, there is no suggestion in the art to combine uplink and downlink location. Reliability would not be enhanced, as the Examiner suggests, because the uplink location is performed on one mobile and the downlink location is performed on another mobile. In addition, the invention achieves a kind of synergy not seen in the prior art because the same at least three measurement units are used for both uplink and downlink.

Applicants respectfully submit that absent any suggestion or motivation in the prior art to combine uplink and downlink using the same at least three measurement units, Claim 18-23 are allowable.

With respect to Claim 24, the uplink and downlink location processing is performed for a single mobile device. While this may improve reliability or accuracy, there is still no suggestion of such a combination in the references. In addition, there is

further no suggestion of using the same at least two measurement units for both uplink and downlink processing. Accordingly Claims 24-30 are believed to be allowable.

Claims 31-45 also relate to combined uplink and downlink location and are believed to be allowable on similar grounds.

`The Examiner's Response to Arguments in the Final Office Action of January 27, 2005 makes several points about Lundqvist which are addressed in turn.

1) According to the Examiner, "Lundqvist discloses that location can be on the mobile station or in the base station, thereby he discloses both methods of location finding." Applicants submit that Page 13, line 13 of Lundqvist suggests that the positioning signal may be sent uplink or downlink. At page 6, line 24, it is presumed that the positioning signal is transmitted uplink. "How to convert the described method to the downlink case will, however, be described in short as well.". This "how to convert" is described at page 13, lines 12 et seq.

There is however, no discussion or suggestion at page 13, lines 12 et seq. of using both uplink and downlink in a single system. They are both described, but as alternatives, not a combination. Page 13 describes the downlink versions as modifications to the uplink examples and does not suggest that they are additions. The Examiner would seem to suggest that it would be obvious to combine uplink and downlink position signals in a single Lundqvist system. The motivation is to boost reliability.

Applicants submit that combining uplink and downlink position signals is neither taught nor suggested by any of the references and instead that this suggestion comes only from impermissible hindsight. The idea of a reliability motivation is not supported by the record and reliability is not necessarily achieved by the combination.

2) According to the Examiner, "Lundqvist discloses using the same base stations for both uplink and downlink." Applicants submit that Lundqvist shows a single mobile position center 111 that, in Figure 1b, issues orders 160 to other base stations 158 and receives measurement results 162 back. It reports an estimate on line 156. However, in Lundqvist, this can only be used for uplink position signals.

On page 5, line 27- page 6, line 13, downlink signals must be measured by the mobile station, not base stations as shown in Figure 1b. At page 6, line 23, the drawings are based on the presumption that the positioning signal is transmitted on the uplink. Starting at page 13, lines 12 et seq. when downlink positioning signals are discussed, there is no mention of where the mobile position center or position signal scanners may be. (Note that the last paragraph of page 14 refers to when the mobile station sends the positioning pulse.

Applicants accordingly submit that there is no suggestion of using the same measurement units for both uplink and downlink. On the contrary, the approaches described in Lundqvist for downlink location would seem to require hardware in the mobile station separate and apart from the hardware in the base stations.

The remaining claims in the first group of 18-30 are not independently discussed and the Examiner has not cited any other references for the teachings discussed above.

B. REJECTION OF CLAIMS 31, 32, and 38 UNDER 35 USC §103 IS IMPROPER BECAUSE THE REFERENCES FAIL TO SUGGEST MEASUREMENT UNITS HAVING AN UPLINK MODE AND A DOWNLINK MODE.

The Examiner has rejected claims 31-32 and 38 under 35 U.S.C. § 103(a) as being unpatentable over Fox in view of Morris, U.S. Patent No. 6,314,535 ("Morris"). Fox

explains that uplink and downlink location services are known in the background section. Most of the Detailed Description is directed to uplink systems (See e.g. col. 3, line 49) as shown in Figure 2 (col. 4, line 29). Near the end of the Detailed Description, downlink systems are described with reference to the hardware of Figure 7 (See e.g. Col. 9, line 1). Applicants are unable to find any suggestion that one system perform both uplink and downlink location services. The specification states that the described algorithms may be used in both modes but not necessarily in the same hardware or system. The use of a different Figure suggests that these are alternatives.

Claim 31 recites, "at least three measurement units, having an uplink mode and a downlink mode." Applicants find no suggestion that any measurement units in Fox have both an uplink and a downlink mode. Claim 31 further recites details about the measurement units and their interactions with an uplink processor and a downlink processor. Fox does not describe any device which interacts with both an uplink processor and a downlink processor.

Morris describes an FEC processor that operates on uplink and downlink signals but does not suggest that measurement units for determining the location of a mobile device operate in both an uplink and a downlink mode. While uplink and downlink traffic is contemplated in most wireless communication systems, uplink and downlink location services are typically seen as alternatives. The present invention combines the two former alternatives, obtaining the benefits spelled out in the detailed description.

The remaining claims in the second group of 31-45 are not independently discussed and the Examiner has not cited any other references for the teachings discussed above.

IX. CONCLUSION

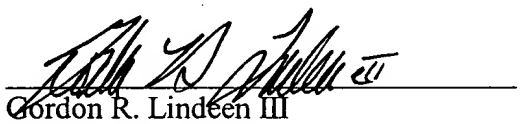
Appellant respectfully submits that all the appealed claims in this application are patentable and requests that the Board of Patent Appeals and Interferences overrule the Examiner and direct allowance of the rejected claims.

This brief is submitted in triplicate, along with a check for $500.00 to cover the appeal fee for one other than a small entity as specified in 37 C.F.R. § 1.17(c). Please charge any shortages and credit any overpayment to out Deposit Account No. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN

Date: 6/28/15



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APPENDIX OF CLAIMS (37 C.F.R. § 1.192(c)(7))

The claims on appeal read as follows:

18. A method of locating mobile devices, the method comprising:

measuring times of arrival of an uplink signal from a first mobile device at each of at least three measurement units;

computing a location of the first mobile device based on the measured times of arrival of the uplink signal;

measuring at the at least three measurement units times of arrival of downlink signals from each of at least three base stations;

receiving time of arrival measurements of the downlink signals from a second mobile device; and

computing a location of the second mobile device based on the measured times of arrival of the downlink signals and the received time of arrival measurements from the second mobile device.

19. The method of Claim 18, further comprising measuring times of arrival of the downlink signals at the second mobile device.

20. The method of Claim 18, wherein computing a location of the first mobile device comprises implementing an uplink location algorithm and computing the location of the second mobile device comprises implementing a downlink location algorithm.

21. The method of Claim 18, wherein computing a location of the second mobile device comprises:

defining a first hyperbola based on the measured times of arrival of the at least three measurement units;

defining a second hyperbola based on the received time of arrival measurements ; and

locating an intersection of the first hyperbola and the second hyperbola.

22. The method of Claim 18, wherein the uplink signal comprises a random access channel signal.

23. The method of Claim 18, wherein the downlink signal comprises a broadcast channel signal.

24. A method of locating a mobile device, the method comprising:

determining at each of at least two measurement units times of arrival of an uplink signal from the mobile device;

determining at the at least two measurement units times of arrival of downlink signals from each of at least two base stations;

receiving from the mobile device time of arrival determinations for the downlink signals from the at least two base stations; and

computing a location of the mobile device based on the determined times of arrival.

25. The method of Claim 24, further comprising sending the determined times of arrival to a mobile location center and wherein computing a location comprises computing a location at the mobile location center.

26. The method of Claim 25, wherein receiving the time of arrival determinations from the mobile device comprises receiving the time of arrival determinations from the mobile device at the mobile location center.

27. The method of Claim 24, wherein computing a location of the mobile device comprises implementing an uplink location algorithm and implementing a

downlink location algorithm.

28. The method of Claim 24, wherein computing a location of the mobile device comprises:

defining a first hyperbola based on the times of arrival of the uplink signal;

defining a second hyperbola based on the times of arrival of the downlink signals; and

locating an intersection of the first hyperbola and the second hyperbola.

29. The method of Claim 24, wherein the uplink signal comprises a random access channel signal.

30. The method of Claim 24, wherein the downlink signal comprises a broadcast channel signal.

31. A system for determining the location of a mobile device comprising:

an uplink processor to implement an uplink location algorithm;

a downlink processor to implement a downlink location algorithm;

at least three base stations, located at known locations, to communicate with the mobile device; and

at least three measurement units, having an uplink mode and a downlink mode,

wherein, in the uplink mode, each of the measurement units determines a time of arrival of an uplink signal that originated from the mobile device and reports the determined time of arrival to the uplink processor, and the uplink processor determines the location of the mobile device using the uplink location algorithm based on the times of arrival reported to the uplink processor by the measurement units, and

wherein, in the downlink mode, the mobile device determines times of arrival of downlink signals arriving from each of the at least three base stations and reports the

determined times of arrival to the downlink processor, the measurement units collectively determine a time of arrival of downlink signals that originated from each of the at least three base stations and report the determined times of arrival to the downlink processor, and the downlink processor determines the location of the mobile device using the downlink location algorithm based on the times of arrival reported to the downlink processor by the mobile device and by the measurement units.

32. The system of Claim 31, wherein the uplink processor and the downlink processor are implemented in the same processor.

33. The system of Claim 31, wherein the uplink processor and the downlink processor are implemented in discrete devices.

34. The system of Claim 31, wherein each of the measurement units includes a dual mode uplink/downlink receiver.

35. The system of Claim 31, wherein each of the measurement units include a downlink receiver that is distinct from the uplink receiver.

36. The system of Claim 31, wherein each of the measurement units determines times of arrival for signals corresponding to at least two different communication protocols.

37. The system of Claim 36, wherein the at least two different communication protocols includes time division multiple access (TDMA) and global system for mobile communication (GSM) systems.

38. An apparatus comprising:

a receiver to note a time of arrival of an uplink signal arriving from a mobile device at an unknown location, to forward the noted time of arrival of the uplink signal to an uplink processor, to note a time of arrival of a downlink signal arriving from a base

station at a known location, and to forward the noted time of arrival of the downlink signal to a downlink processor.

39. The apparatus of Claim 38, wherein the receiver comprises a uplink circuit card to note the time of arrival of the uplink signal and a downlink circuit card to note the time of arrival of the downlink signal.

40. The apparatus of Claim 39, wherein the uplink circuit card and the downlink circuit card are plugged into a common backplane.

41. The apparatus of Claim 40, further comprising a controller plugged into the common backplane to control the uplink circuit card and the downlink circuit card.

42. The apparatus of Claim 40, wherein the uplink signal comprises a random access channel signal, and the downlink signal comprises a broadcast control channel signal.

43. The apparatus of Claim 40, wherein the receiver determines times of arrival for signals corresponding to at least two different communication protocols.

44. The apparatus of Claim 43, wherein the at least two different communication protocols includes time division multiple access (TDMA) and global system for mobile communication (GSM) systems.

45. The apparatus of Claim 40, further comprising a mobile location center comprising:

the uplink processor to receive the forwarded time of the arrival of the uplink signal and to implement an uplink location algorithm; and

the downlink processor to receive the forwarded time of arrival of the downlink signal and to implement a downlink location algorithm.

FEE TRANSMITTAL for FY 2005

Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27.

TOTAL AMOUNT OF PAYMENT	($)	620.00

Complete if Known	
Application Number	09/698,536
Filing Date	October 27, 2000
First Named Inventor	Gregory G. Davis
Examiner Name	Torres, M.
Art Unit	2686
Attorney Docket No.	42390P11619

METHOD OF PAYMENT *(check all that apply)*

☒ Check ☐ Credit card ☐ Money Order ☐ None ☐ Other (please identify): _____

☒ Deposit Account Deposit Account Number: 02-2666 Deposit Account Name: Blakely, Sokoloff, Taylor & Zafman LLP

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, except for the filing fee

☒ Charge any additional fee(s) or underpayment of fee(s) under 37 CFR §§ 1.16, 1.17, 1.18 and 1.20. ☒ Credit any overpayments

FEE CALCULATION

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
2053	130	2053	130	Non-English specification	
1251	120	2251	60	Extension for reply within first month	120.00
1252	450	2252	225	Extension for reply within second month	
1253	1,020	2253	510	Extension for reply within third month	
1254	1,590	2254	795	Extension for reply within fourth month	
1255	2,160	2255	1,080	Extension for reply within fifth month	
1401	500	2401	250	Notice of Appeal	500.00
1402	500	2402	250	Filing a brief in support of an appeal	
1403	1,000	2403	500	Request for oral hearing	
1451	1,510	2451	1,510	Petition to institute a public use proceeding	
1460	130	2460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
1809	790	1809	395	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	790	2810	395	For each additional invention to be examined (37 CFR § 1.129(b))	
				Other fee (specify) _____	
				SUBTOTAL (2)	($) 620.00

SUBMITTED BY Complete (if applicable)

Name (Print/Type)	Gordon R. Lindeen III	Registration No. (Attorney/Agent)	33,192	Telephone	(303) 740-1980
Signature				Date	06/28/05

Based on PTO/SB/17 (12-04) as modified by Blakely, Sokoloff, Taylor & Zafman (wlr) 12/15/2004.
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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

Application No.	09/698,536
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First Named Inventor	Gregory G. Davis
Art Unit	2686
Examiner Name	Torres, M.
Attorney Docket Number	42390P11619

ENCLOSURES ***(check all that apply)***

- ☒ Fee Transmittal Form
  - ☒ Fee Attached
- ☐ Amendment / Response
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☒ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
  - ☐ PTO/SB/08
- ☐ Certified Copy of Priority Document(s)
- ☐ Response to Missing Parts/ Incomplete Application
  - ☐ Basic Filing Fee
  - ☐ Declaration/POA
  - ☐ Response to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
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- ☐ Petition
- ☐ Petition to Convert a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s)
- ☐ After Allowance Communication to Group
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☒ Appeal Communication to Group **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☒ Other Enclosure(s) *(please identify below):*

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Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm *or* Individual name	Gordon R. Lindeen III, Reg. No. 33,192 BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP
Signature	
Date	June 28, 2005

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Typed or printed name	**Debbie Casias**		
Signature	Debbie Casias	Date	**June 28, 2005**

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Date: June 28, 2005

Debbie Casias — 6/28/05

Debbie Casias — ***Date***